7428 Rockville Road | Indianapolis, IN 46214 | 317.347.1111 office | 317.347.9326 fax

September 10, 2018

Ms. Carolyn Bury
Project Manager
Corrective Action Section 2
Remediation and Re-use Branch
U.S. Environmental Protection Agency, Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590

Re: **Offsite Groundwater Monitoring Well Redevelopment & Sampling Work Plan**
Franklin Power Products, Inc./Amphenol Corporation
Administrative Order on Consent, Docket # R8H-5-99-002
EPA ID # IND 044 587 848
980 Hurricane Road
Franklin, Indiana 46131

Dear Ms. Bury:

In accordance with the United States Environmental Protection Agency (USEPA) letter dated August 30, 2018, Industrial Waste Management Consulting Group, LLC (IWM Consulting), on behalf of the "Performing Respondent", Amphenol Corporation (Amphenol), is submitting this Offsite Groundwater Monitoring Well Redevelopment & Sampling Work Plan (Work Plan). The Work Plan outlines the proposed work activities relating to developing and sampling five (5) existing offsite groundwater monitoring wells. Four (4) of the monitoring wells (MW-31, MW-32, MW-33, MW-34) were installed in April 1996 and one (1) monitoring well (MW-35) was installed in April 1997. All of the offsite monitoring wells have been field located and generally appear to be in good condition. However, the wells have not been sampled for several years and should be properly developed prior to sampling.

The objective of the proposed work activities is as follows:

- Further evaluate the condition of the groundwater monitoring wells to determine if they are acceptable for use as a groundwater monitoring point;
- Determine if dissolved volatile organic compounds (VOCs) are present within one (1) or more of the offsite groundwater monitoring wells;
- Determine site specific groundwater flow direction using depth to groundwater measurements obtained from both onsite and offsite groundwater monitoring wells; and
- Utilize this data to guide the development of an appropriate offsite investigation Work Plan.

Although it is understood that the USEPA has requested additional work as part of the August 30, 2018 letter, additional sampling activities are not being proposed as part of this Work Plan. Those activities will be discussed in future Work Plan(s) submitted to the USEPA. However, as discussed recently with the USEPA and with your concurrence, IWM Consulting and Amphenol would like to complete the proposed work activities as quickly as possible in order to assist in developing future Work Plans. Consequently, this Work Plan is being submitted independently from the other Work Plans.

This Work Plan outlines the proposed methodology and sampling activities that will be utilized during the Work Plan implementation activities. A site vicinity map is provided as **Figure 1**, which displays the location

of the Site and properties in the vicinity of the Site. **Figure 2** displays the location of the existing onsite and offsite groundwater monitoring well network. A copy of the August 30, 2018 USEPA letter is provided as **Attachment A**.

Proposed Well Inspection and Redevelopment Activities

IWM Consulting personnel will reinspect the five (5) offsite groundwater monitoring wells (including the well casing, gripper plugs, and protective well casings) and obtain initial depth to groundwater and total well depth information for each well. Each well will be redeveloped using a dedicated, bottom loading disposable polyethylene bailer and an appropriate amount of twine/rope in order to remove groundwater and any sediment or fines which may have accumulated within the well. This will also facilitate better communication between the well and the surrounding water bearing unit. The redevelopment activities will be considered complete when approximately 3-5 well volumes of standing groundwater from each monitoring well has been removed or if the well runs dry three (3) times, whichever occurs first. Additional well volumes may be removed if the groundwater being removed from the well continues to visually look cloudy or if fines appear to still be present at the bottom of the well after the initial redevelopment activities have been completed. Upon completion of the redevelopment activities, the depth to groundwater and total well depth will be remeasured and compared to the original measurements made prior to the redevelopment activities and to the original well construction information. IWM Consulting will also record the total volume of groundwater removed from each well.

All of the redevelopment water will be temporarily containerized within a labeled 55-gallon DOT approved steel drum, transported back to the Site, and then treated by the onsite groundwater remediation system, prior to discharging to the onsite sanitary sewer per the approved municipal discharge permit with the City of Franklin.

Please note two (2) additional groundwater piezometers (P-1 and P-2) exist in the immediate vicinity of existing groundwater monitoring well MW-31 and both of these piezometers were recently field located by IWM Consulting personnel. P-1 is located approximately 18.5 feet north of MW-31 and P-2 is located approximately 13.5 feet south of MW-31. Since P-1 and P-2 were designed to be utilized for groundwater measurements only and because of their close proximity to MW-31, IWM Consulting only proposes to redevelop and sample monitoring well MW-31. Also, if any well is deemed unacceptable from an integrity standpoint, that well will not be sampled during this phase of the investigation and a subsequent discussion with the USEPA will be made regarding the next steps relating to that particular offsite well location.

Groundwater Gauging Activities

IWM Consulting proposes to obtain depth to groundwater measurements from select onsite wells (IT-2, IT-3, MW-3, MW-9, MW-12R, MW-21, MW-22, MW-24, MW-26, MW-27, MW-28, MW-29, MW-30, RW-1, RW-2, RW-3, RW-4, and RW-5) and the five offsite wells (MW-31, MW-32, MW-33, MW-34, and MW-35) as part of these work activities. The measurements will be obtained with an electronic water meter capable of detecting depth to groundwater measurements to within 0.01 feet. The measurements will be obtained on the same day and will be utilized to generate a site-specific groundwater elevation map.

Low Flow Groundwater Sampling Activities

A minimum of 48-hours after the well redevelopment activities, IWM Consulting personnel will conduct one (1) low flow groundwater sampling event for all offsite wells that have been deemed acceptable from an integrity standpoint. The groundwater samples will be collected using low flow sampling techniques and depth to groundwater measurements will be recorded prior to and during the sampling activities. If an insufficient amount of groundwater (<2.5 feet) is present within the well and low flow sampling cannot be completed, then the groundwater sample will be obtained with disposable polyethylene bailer after removing three (3) volumes of groundwater or after the well purges dry, whichever occurs first. If the samples are obtained with a bailer, care will be taken to slowly lower the bailer in and out of the well in order to minimize agitation the water column.

Purge water generated during the groundwater sampling activities will be temporarily containerized within a labeled 55-gallon DOT approved steel drum, transported back to the Site, and then treated by the onsite groundwater remediation system, prior to discharging to the onsite sanitary sewer per the approved municipal discharge permit with the City of Franklin.

A portable bladder pump in conjunction with an YSI 556 MPS Multi-Probe Field Meter or equivalent will be used to collect groundwater samples from the monitoring wells. The pump is equipped with a disposable bladder sleeve that is exchanged between wells. Dedicated tubing will be used for each well. The Multi-Probe Field Meter includes probes for temperature, pH, specific conductance, dissolved oxygen (DO), and oxidation-reduction potential (ORP). Purge rates will be established to insure minimal drawdown. Minimal drawdown is defined as being less than 0.33 feet of drawdown during a purge cycle. Water levels will be monitored in each monitoring well during the purging cycle.

Field parameters will be measured during the sampling event, and groundwater samples will be collected after the field parameters have stabilized (for three consecutive readings), after a maximum of 1 hour of purge time, or immediately prior to the wells running dry (if insufficient groundwater recharge occurs). Care will be taken to ensure that the bladder pump discharge tubing and flow through cell have evacuated several volumes of water before the samples are obtained. Groundwater stabilization criteria which will be utilized during the purging activities are listed below:

- pH + 0.1 pH units
- Specific Conductance + 3% of reading
- DO + 10% of reading or + 0.2 mg/L
- ORP + 10 millivolts

The groundwater samples will then be collected from the monitoring wells and placed into the appropriate laboratory provided pre-labeled containers. The groundwater samples will be submitted to Pace Analytical Services, LLC located in Indianapolis, Indiana and analyzed for shortlist VOCs using SW-846 Method 8260 using Level IV Quality Assurance/Quality Control (QA/QC). The shortlist VOCs include the following compounds: vinyl chloride (VC), trans 1,2-dichloroethene (trans 1,2-DCE), 1,1-dichloroethane (1,1-DCA), cis 1,2-dichloroethene (cis 1,2-DCE), 1,2-dichloroethane (1,2-DCA), methylene chloride, 1,1,1-trichloroethane (1,1,1-TCA), trichloroethylene (TCE), and tetrachloroethylene (PCE). The laboratory results of the sampling event are anticipated to be received within 2 working days from the date the samples are collected in the field.

For QA/QC purposes, one (1) field duplicate and one (1) matrix spike/matrix spike duplicate (MS/MSD) sample will be collected at a rate of one (1) sample per every twenty (20) confirmatory samples and will be analyzed for the same analytical parameters. One (1) trip blank for VOC analysis will accompany each cooler shipment that contains samples for VOC analyses. One (1) equipment blank will also be obtained during the sampling event. The equipment blank will be collected by pouring laboratory-prepared water or distilled water over or through the field sampling equipment (e.g., the bladder pump or water level indicator) and collecting the rinsate in the proper analytical containers.

A copy of all of the applicable Standard Operating Procedures (SOPs) which will be followed by IWM Consulting during the groundwater sampling activities is provided as **Attachment B**. A copy of the Pace chain-of-custody (COC) which will be utilized during the work activities is provided as **Attachment C.** Pertinent information such as laboratory certifications and a table summarizing the corresponding method detection and reporting limits for Pace are provided as **Attachment D**.

Reporting

Preliminary results (copy of the laboratory report) will be supplied to representatives from the USEPA as soon as possible once the information has been received and reviewed. A brief letter report will also be generated and submitted to the USEPA within approximately 2-weeks of receiving the analytical results. The groundwater analytical results will be compared to the USEPA Published Maximum Contaminant Levels (MCLs) and Residential Vapor Intrusion Screening Levels (VISLs). The results will also be evaluated in accordance with the Residential Vapor Exposure Groundwater Screening Levels, as outlined in Table A-6, Appendix A, of the Indiana Department of Environmental Management (IDEM) Remediation Closure Guide (RCG), updated March 7, 2018.

The letter report will summarize the sampling activities and results and this information will assist in developing future offsite investigation Work Plan(s). The analytical results will be validated by a third party and the validation will be included within the letter report being submitted to the USEPA. A copy of the applicable USEPA Regional Screening Levels (shortened to be Site specific) is provided as **Attachment E** and a copy of the IDEM RCG Screening Levels (shortened to be Site specific) is provided as **Attachment F**. A table summarizing the Pace reporting and method detection limits for each compound compared to the MCLs and Residential VISLs is included below:

VOC Compound	Pace Laboratory Reporting Limits (ug/L)	Pace Laboratory Method Detection Limits (ug/L)	MCL (ug/L)	Target Groundwater Concentration for Residential VISLs (ug/L)
1,1 Dichloroethane	5.0	0.60	NA	7.6
1,2 Dichloroethane	5.0	0.60	5.0	2.2
cis 1,2- Dichloroethylene	5.0	0.65	70	NA
trans 1,2- Dichloroethylene	5.0	0.86	100	NA
Methylene Chloride	5.0	5.0	5.0	760
Tetrachloroethylene (PCE)	5.0	0.93	5.0	15
1,1,1 Trichloroethane	5.0	0.89	200	7,400
Trichloroethylene (TCE)	5.0	0.80	5.0	1.2
Vinyl Chloride	2.0	0.97	2.0	0.15

IWM Consulting will implement the proposed work activities as quickly as possible upon receiving USEPA approval of this Work Plan with expectation that the work will be completed the week of September 10, 2018. Please do not hesitate to contact the undersigned with questions or if you need additional information regarding this submittal.

Sincerely,

IWM CONSULTING GROUP, LLC

Bradley E. Gentry, LPG #2165
Vice President/Brownfield Coordinator

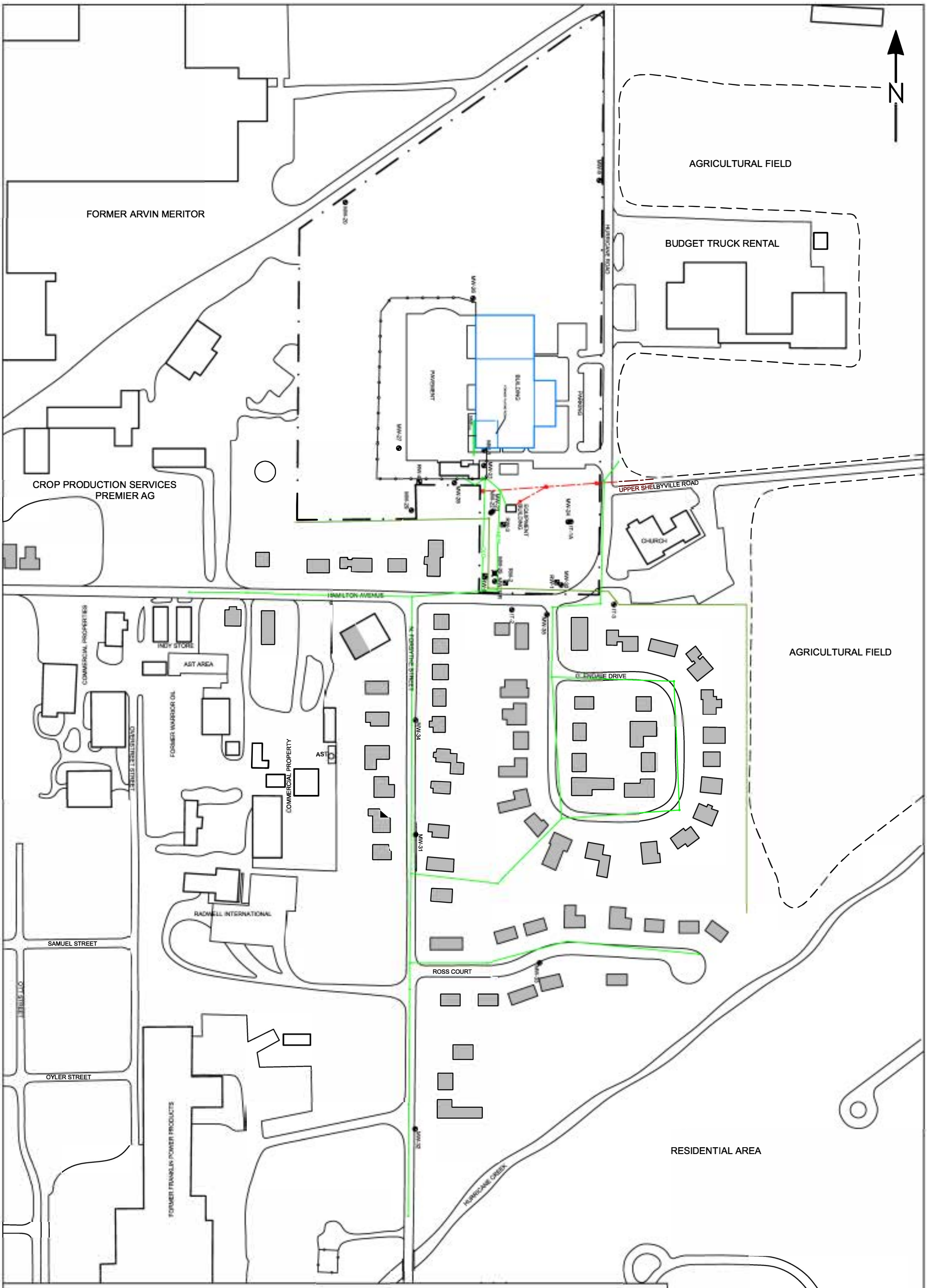
Gregory S. Scarpone, LPG #2030
Vice President Environmental Services

cc: Mr. Joseph Bianchi, Amphenol (electronic only)
Bhooma Sundar, U.S. EPA Region 5, RRB CAS2 (electronic only)
Conor Neal, U.S. EPA Region 5, RRB CAS2 (electronic only)

Attachments

Figures

0' 300' SCALE IN FEET	DRAWN BY: L. STRUM DATE: 9/27/99 REVISED: 07/24/2018 HWPA #111291-01 DWG. NO. 111291S1	FIGURE 1 SITE VICINITY MAP	FORMER AMPHENOL RFI/CMS 980 HURRICANE ROAD FRANKLIN, INDIANA	iWM CONSULTING GROUP


N
FORMER ARVIN MERITOR
AGRICULTURAL FIELD
BUDGET TRUCK RENTAL
CROP PRODUCTION SERVICES
PREMIER AG
UPPER SHELBYVILLE ROAD
CHURCH
HAMILTON AVENUE
AGRICULTURAL FIELD
INDY STORE
AST AREA
COMMERCIAL PROPERTY
FORMER WARRIOR OIL
CHRISTINE STREET
N. FORSYTHE STREET
CHEVROLET DRIVE
MW-34
MW-31
RADWELL INTERNATIONAL
SAMUEL STREET
ROSS COURT
OYLER STREET
FORMER FRANKLIN POWER PRODUCTS
HURRICANE CREEK
RESIDENTIAL AREA
LEGEND
ABANDONED MONITORING WELL
MONITORING WELL
RECOVERY WELL
PROPERTY LINE (APPROXIMATE)
STORM SEWER
SANITARY SEWER
O/H POWER
RESIDENTIAL HOME
* DETACHED GARAGES & SHEDS NOT SHOWN
NON-RESIDENTIAL STRUCTURE
PRIMARY BUILDING WALLS
0'
200'
SCALE IN FEET
DRAWN BY: L. STRUM
DATE: 9/27/99
REVISED: 08/29/2018
HWPA #111291-01
DWG. NO. 111291S1
FIGURE 2
SITE MAP
FORMER AMPHENOL RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA
IWM
CONSULTING GROUP

Attachments

Attachment A

USEPA Letter Dated August 30, 2018

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

LU-16J

Via E-mail and Certified Mail 7009 1680 0000 7671 2323
RETURN RECEIPT REQUESTED

August 30, 2018

Mr. Joseph M. Bianchi
Group EHS Manager
Amphenol Corporation
40-60 Delaware Avenue
Sidney, NY 13838

Mr. Matt Kupcak
Director, Global Environmental Programs
BorgWarner Inc.
3850 Hamlin Road
Auburn Hills, MI 48326

Subject: Franklin Power Products, Inc./Amphenol Corporation
Request for Vapor Intrusion Investigation
Administrative Order on Consent, Docket # R8H-5-99-002
EPA ID# IND 044 587 848

Dear Mr. Bianchi and Mr. Kupcak:

Under Section VIII, Paragraph N (Additional Work) of the RCRA 3008(h) Administrative Order on Consent dated November 24, 1998 (Order), EPA has determined that Respondents Amphenol Corporation and Franklin Power Products, Inc. (FPP/Amphenol), must perform Additional Work at the facility at 980 Hurricane Road in Franklin, Indiana ("Facility" or "Site"). The Additional Work described in this letter is necessary to meet the purposes of the Order, including but not limited to, assuring the selected corrective measures address the actual and potential threats to human health and the environment presented by the actual and potential releases of hazardous wastes or hazardous constituents at or from the Facility.

Summary of Requested Work

EPA met with Amphenol Corp. on August 7 and 8, 2018 to outline the approach to the overall vapor intrusion (VI) investigation in the off-Site Study Area (see below and enclosure). to be proposed to EPA in a Work Plan. The purpose of this investigation is to evaluate the potential for vapors to enter indoor spaces through volatilization from groundwater or *via* direct entry from sewer lines. The Work Plan must propose field and

analytical approaches to measuring VOCs in environmental media, including indoor air, and propose measures to mitigate unacceptable exposures and protect human health.

As discussed during the August 7 and 8 meetings, exterior soil gas samples will be taken along rights-of-ways (ROWS) within the Study Area to expedite the investigation. Amphenol Corp. met with City of Franklin representatives to discuss an access agreement soon after the meeting with EPA and later, on August 20, 2018, Amphenol Corp. attended a City of Franklin Public Works Board Meeting and formally requested a blanket ROW access agreement for the Study Area.

By September 17, 2018, EPA requests that you submit a Vapor Intrusion Investigation Work Plan ("Work Plan") to investigate potential vapor intrusion (VI) in the Study Area. Respondents must investigate whether a complete pathway of volatile constituents is present from historical solvent releases at the Site to off-Site receptors. Primary migration pathways of concern include storm and sanitary sewers, and groundwater to soil. The Work Plan must be consistent with EPA guidance found in *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air* (EPA OSWER, 2015).

Respondents and EPA will coordinate closely during plan development with the objective of Work Plan execution upon approval.

Purpose of Sampling Event

The primary objective of the requested investigation is to determine whether potential Study Area vapor intrusion requires mitigation measures to protect human health.

Study Area

The investigation will focus on the Study Area where VOCs were historically present in groundwater, soil gas, and sewer gas downgradient of the Site at elevated levels. EPA evaluated historical environmental data provided under the Corrective Action order (circa 1990's) to guide the planning and scope of the investigation. The Study Area boundary was based on historical data and current remedial operations reports: the remedial facility investigation; corrective measures study; and (ongoing) corrective measures implementation phases of the corrective action work. Data from the VI investigation will be used to inform next steps, including a need to expand the Study Area, and to determine a need for additional remedial measures.

The Study Area includes portions of streets that are near and downgradient of the former facility: Hurricane Road, Hamilton Avenue, Forsythe Street, Glendale Drive, and Ross Court (figure provided by Amphenol Corp. enclosed).

Please provide a draft Conceptual Site Model (CSM) with the investigation report using the collected data for evaluating conditions and informing next steps. In a subsequent work plan request, EPA will require that current groundwater conditions be delineated. This work will update the CSM and inform decisions regarding a need to expand the Study Area.

Work Plan

The Work Plan must describe the general approach to collecting VOC samples for evaluating potential soil vapor intrusion pathways in the Study Area and provide the field and analytical SOPs for completing the work.

Following the demonstration of a complete exposure pathway of VOCs in indoor air, determinations will be made regarding the need for mitigation in individual homes and remediation in areas of preferential pathways. To the extent practical, investigations within buildings and on individual properties should ensue with the goal of limiting return visits, which can cause disruption and inconvenience for building occupants and owners. EPA recognizes potential delays with obtaining formal access to homes/buildings and the potential need for more than one mobilization.

Soil Gas Samples To expedite the investigation, exterior soil gas samples will be taken along rights-of-ways (ROWS) within the Study Area where Amphenol Corp. has formally requested a blanket access agreement with the City of Franklin. Sample results above EPA soil gas screening levels at the ROW locations near homes initiates the requirement for concurrent collection of sub-slab and indoor air samples at adjacent homes.

Sub-Slab and Indoor Air Samples The Work Plan must identify the approach to sub-slab and indoor air sampling and include a summary of the plan to obtain access to homes.

Sewer Gas VOC Samples The Work Plan should propose sample locations and describe the rationale for continuing the VI investigation along the pathway. Include the following locations in the work plan:

1) manholes within the streets identified in the Study Area;
2) lateral sewer lines if sewer gas exceeds EPA indoor air screening levels; and,

3) indoor samples in bathrooms if lateral sewer samples exceed EPA indoor air screening levels.

Where sewer gas levels exceed EPA indoor air screening levels, a sewer video survey should be completed to characterize conditions that could provide a pathway for entry of soil vapors from underlying soil or groundwater (cracks and other defects).

The Work Plan should include a table showing which sample type will be compared to which screening value for each chemical on the analyte list.

Groundwater Samples

As part of this investigation, you must sample groundwater any intact monitoring wells in the Study Area, and measure water levels.

Analyte List

Samples will be analyzed for these Site-related constituents identified in previous investigations and sampling events conducted under the AOCs: vinyl chloride (VC), trans-1,2-dichloroethylene (trans-1,2-DCE), 1,1-dichloroethane (1,1-DCA), cis-1,2-dichloroethylene (cis-1,2-DCE), 1,2-dichloroethane (1,2-DCA), methylene chloride, 1,1,1- trichloroethane (1,1,1 TCA), trichloroethylene (TCE), and tetrachloroethylene (PCE).

Third-party Validation

Analytical results must be validated by a qualified data validation that is independent of the project.

Quality Assurance

The Quality Assurance (QA) Plan must be consistent with EPA's QA/R-5, *EPA Requirements for Quality Assurance Project Plans* (EPA 2001) found at https://www.epa.gov/sites/production/files/2016-06/documents/r5-final_0.pdf. All samples must be analyzed by a laboratory with appropriate ELAP certification, as specified in the guidance. Please also refer to *Guidance for Quality Assurance Project Plans*, EPA QA/G-5 (EPA 2002) when developing the QA/Quality Control portions of the Work Plan.

Response Plan

Respondents' proposed Work Plan must include the proposed response measures for mitigating vapor entry into buildings from the soil column and terminating the potential migration of soil vapors into buildings via a sewer pathway. If the investigation results in additional VI pathways (along other utilities), then Respondents must propose corresponding remedial measures.

Potential On-Site Investigative Work

During the August 7 and 8, 2018 meeting and site visit, EPA and Amphenol Corp discussed the need for and approach to indoor air sampling in the occupied buildings on the former facility property. Respondents may include the on-Site VI work in the subject Work Plan. Alternatively, that investigation could be included in the second ambient air sampling event scheduled for this fall.

Schedule

The proposed Work Plan must include a schedule of activities from pre-work plan activities through final report submittal.

Next Steps - Other Corrective Action Work

When this investigation is completed, EPA will determine whether there is a need for additional VI investigation in an expanded area. EPA will require a groundwater investigation to determine whether a plume is present downgradient of the Site and whether Site constituents of concern (COCs) impact human health and the environment.

The plume will be defined two ways:

1) COCs exceeding EPA Maximum Contaminant Levels (MCLs) or Vapor Intrusion Screening Levels (VISLs); and,
2) COCs exceeding water quality standards at Hurricane Creek.

In addition, the extent of any source materials must be determined, including DNAPL or contaminated soils contributing to a groundwater plume related to Site activities. The extent of soil contamination will be determined by:

1) COCs exceeding Indiana's Residential Soil Migration to Groundwater Screening Levels (MTGSLs) in unsaturated soils; and,

2) Saturated soils exceeding a soil screening level calculated using EPA's *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (EPA OSWER, 2002). See https://semspub.epa.gov/work/HQ/175878.pdf.

If you have any questions, please contact me at (312) 886-3020. Also, please feel free to contact Dr. Bhooma Sundar, EPA risk assessor, at (312) 886-1660 to assist you in Work Plan development.

Sincerely,

Carolyn Bury
Project Manager
Corrective Action Section 2
Remediation and Re-use Branch

Enclosure

ecc: Brad Gentry, IWM Consulting Group, LLC.
Don Stilz, IDEM
Bhooma Sundar, RRB CAS2
Conor Neal, RRB CAS2

Attachment B

IWM Consulting SOPs

SOP Group C

Standard Operating Procedures for Water Sampling

TABLE OF CONTENTS

SOP Group C

Standard Operating Procedures for Water Sampling

Introduction

The purpose of this standard operating procedure (SOP) is to describe the procedures for the collection of representative groundwater samples. Analysis of groundwater samples may determine whether concentrations of specific pollutants exceed established action levels, or if the concentrations of pollutants present a risk to public health, welfare, or the environment.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent upon site conditions, equipment limitations or limitations imposed by the procedure. In all instances, the actual procedures used should be documented and described in the field book and in the appropriate site report. Mention of trade names or commercial products does not constitute an endorsement or recommendation for use.

SOP C.1 Method Summary

C.1.1 Bailer Method

This method emphasizes the need to remove the stagnant water contained in the monitoring well to collect a representative groundwater sample. Purging at least three well volumes before sample collection is necessary to insure a representative groundwater sample is obtained. Well volumes can be calculated using standard casing volume per foot factors for the appropriate well diameter and the measured length of the water column. The appropriate casing volumes per foot factors for common well casing diameters are:

Well Casing Diameter (inches) vs. Volume (gallons) Per Foot of Water	
Casing Diameter (in)	Gallons/ft
¾”	0.023
1”	0.041
2”	0.163
4”	0.653
6”	1.469
12”	5.875

Water level indicators are to be decontaminated prior to the initial measurement and between each monitoring well. Dedicated bailers and rope are to be used to minimize the possibility of cross contamination from previously sampled monitoring wells. The bailer is to be lowered into the water column gently, allowed to fill, and removed slowly to

minimize turbidity and disturbance of volatile organic compounds. Sampling is conducted directly from the bailer. Water quality parameters (pH, temperature, and conductivity) will also be obtained during the sampling process to document that conditions are suitable for sampling to begin following the procedures in section SOP C.5. When obtaining the volatile samples, if bubbles (>6 mm) are present within the 40-mL vials, please follow the procedures outlined in section SOP C.4.

The bailer method's advantages are that it is very portable, inexpensive compared to low-flow sampling, requires no power source, readily available, and is a rapid and simple method for purging small volumes of groundwater. However, the bailer method suffers from the correct technique being highly operator dependant, being time-consuming when purging large volumes, creating the possibility of the sample being disturbed during transfer to the sample containers, and leakages from the ball check at the bottom of the bailer. This method is recommended for temporary monitoring points constructed with casing and screens, monitoring points with very low groundwater recovery rates, or monitoring points with insufficient standing water (typically <3 feet).

Changes to this SOP should be proposed and discussed when the site Sampling and Analysis Plan is submitted for approval. Subsequent requests for modifications of an approved plan must include adequate technical justification for proposed changes. All changes and modifications must be approved before implementation in field.

C.1.2 Low-Flow Method

This method emphasizes the need to minimize stress by low water-level drawdowns, and low pumping rates (usually less than 1liter/min) in order to collect samples with minimal alterations to water chemistry. This method is aimed primarily at sampling monitoring wells that can accept a submersible pump and have a screen, or open interval length of 10 feet or less (this is the most common situation). However, this procedure is flexible and can be used in a variety of well construction and ground-water yield situations. Samples thus obtained are suitable for analyses of ground water contaminants (volatile and semi-volatile organic analytes, pesticides, PCBs, metals and other inorganics), or other naturally occurring analytes.

The screen, or open interval of the monitoring well should be optimally located (both laterally and vertically) to intercept existing contaminant plume(s) or along flow paths of potential contaminant releases. It is presumed that the analytes of interest move (or potentially move) primarily through the more permeable zones within the screen, or open interval.

Proper well construction and development cannot be over emphasized, since the use of installation techniques that are appropriate to the hydrogeologic setting often prevents "problem well" situations from occurring. It is also recommended that as part of development or redevelopment the well should be tested to determine the appropriate pumping rate to obtain stabilization of field indicator parameters with minimal drawdown

in shortest amount of time. With this information field crews can then conduct purging and sampling in a more expeditious manner.

The mid-point of the saturated screen length is used by convention as the location of the pump intake. However, significant chemical or permeability contrast(s) within the screen may require additional field work to determine the optimum vertical location(s) for the intake, and appropriate pumping rate(s) for purging and sampling more localized target zone(s). Primary flow zones (high(er) permeability and/or high(er) chemical concentrations) should be identified in wells with screen lengths longer than 10 feet, or in wells with open boreholes in bedrock. Targeting these zones for water sampling will help insure that the low stress procedure will not underestimate contaminant concentrations. The Sampling and Analysis Plan must provide clear instructions on how the pump intake depth(s) will be selected, and reason(s) for the depth(s) selected.

Stabilization of indicator field parameters is used to indicate that conditions are suitable for sampling to begin. Sample collection may still take place provided the remaining criteria in this procedure are met. If after three (minimum) to six (maximum) well volumes have been purged and indicator field parameters have not stabilized, one of 3 optional courses of action may be taken: a) continue purging until stabilization is achieved, b) discontinue purging, do not collect any samples, and record in log book that stabilization could not be achieved (documentation must describe attempts to achieve stabilization) c) discontinue purging, collect samples and provide full explanation of attempts to achieve stabilization (note: there is a risk that the analytical data obtained, especially metals and strongly hydrophobic organic analytes, may not meet the sampling objectives).

Low-flow sampling has distinct advantages and disadvantages. Low-flow sampling maintains the integrity of the sample if a bladder pump is used. Low-flow sampling is easy to use and can sample from distinct locations in the monitoring well. However, bladder pumps used in low-flow sampling are difficult and time-consuming to decontaminate, only useful with sufficient head above the pump, require cumbersome air cylinders or air compressors and a control box for operation, and can only achieve low pumping rates. Low-flow sampling is not recommended for shallow, temporary monitoring points, monitoring points exhibiting very low groundwater recovery rates, or monitoring points with insufficient amount of standing groundwater (typically <3 feet).

Changes to this SOP should be proposed and discussed when the site Sampling and Analysis Plan is submitted for approval. Subsequent requests for modifications of an approved plan must include adequate technical justification for proposed changes. All changes and modifications must be approved before implementation in field.

SOP C.2 Sampling Preservation, Containers, Handling and Storage

The type of analysis for which a sample is being collected determines the type of bottle, preservative, holding time, and filtering requirements. Sample containers are provided "pre-preserved" by the analytical laboratory. Samples should be collected directly from

the sampling device into appropriate laboratory cleaned containers. Sample containers for volatile compounds should be filled first, followed by containers for semi-volatile compounds and finally non-volatiles such as metals and PCBs. If filtering is required, the sample containers will be unpreserved and the samples will be filtered at the laboratory.

Samples shall be appropriately preserved, labeled, logged, and placed in a cooler to be maintained at ≤ 6°C. Samples should be shipped within 72 hours of sample collection and ideally should be shipped within 24 hours of sample collection. It is imperative that samples be shipped or delivered daily to the analytical laboratory in order to maximize the time available for the laboratory to perform the analyses. The bottles should be shipped with adequate packing and cooling to ensure that they arrive intact.

The focus of concern must remain to provide a valid sample for analysis, one which has been subjected to the least amount of turbulence possible. Due to the extreme trace levels at which volatile organics are detectable, cross contamination and introduction of contaminants must be avoided. Trip blanks are incorporated into the shipment package to provide a check against cross contamination.

SOP C.3 Equipment

C.3.1 Bailer Sampling

- Disposable bailers and disposable sampling twine or polyethylene rope
- Water level indicator or interface probe (if needed) capable of measuring to 0.01 foot accuracy
- Decontamination supplies (for example, non-phosphate detergent, distilled/deionized water, isopropyl alcohol, etc.)
- Sample bottles (as required by analytical methods)
- Well construction and field data from previous event, location map and well keys
- Field notebook and well sampling logs
- Site specific Sample and Analysis Plan/Quality Assurance Project Plan

C.3.2 Low-Flow Sampling

- Stainless steel, adjustable rate, submersible bladder pump and disposable polyethylene rope for lowering the pump into the well
- Polyethylene air tubing and Teflon or Teflon-lined polyethylene sampling tubing
- Water level indicator or interface probe (if needed) capable of measuring to 0.01 foot accuracy
- Flow measurement supplies such as a graduated cylinder and stopwatch
- Compressed air tank and control box such as a QED MP10 Controller
- Water quality multi-probe meter such as an YSI 556 along with 500 mL flow-through cell for stabilization readings. The YSI 556 is to be calibrated daily.
- Decontamination supplies (for example, non-phosphate detergent, distilled/deionized water, isopropyl alcohol, etc.)
- Sample bottles (as required by analytical methods)

- Well construction and field data from previous event, location map and well keys
- Field notebook and well sampling logs
- Site specific Sample and Analysis Plan/Quality Assurance Project Plan

SOP C.4 Interference and Potential Problems

There are two primary potential problems associated with groundwater sampling - cross contamination of samples and improper sample collection. Cross contamination problems can be eliminated or minimized through the use of dedicated sampling equipment such as bailers or low-flow sampling tubing. If this is not possible or practical, then decontamination of sampling equipment, such as the low-flow bladder pump, is necessary. Improper sample collection can involve using contaminated equipment or sampling before stabilization has occurred, resulting in variable, non-representative results. Another way to reduce the chances of cross contamination is to begin groundwater sampling with the monitoring well suspected to contain the least amount of contaminants and continue to the monitoring well suspected to contain the most contamination.

When transferring the water sample into the laboratory provided, hydrochloric acid (HCl) preserved 40-mL vials for VOC analysis, fill the vial slowly to the top of the neck minimizing the amount of air mixed in the water as the vial is filled. The vial must be slightly overfilled in order to ensure no air bubbles are contained in the vial once capped. The water should bulge slightly over the top of the vial. Do not excessively overfill the vial as the overflow will contain the HCl preservative and may burn the skin. While holding the vial level, screw the cap on tightly. The septum in the cap should bulge slightly when properly closed. Invert the vial and tap lightly to dislodge any trapped bubbles. If bubbles (>6mm) are present, open the vial and attempt to add additional water to the vial. If bubbles continue to remain within the sampling container, repeat the sampling process while using a new, HCl preserved 40-mL vial. If bubbles continue to be present within the HCl preserved vial, utilize unpreserved 40-mL vials when containerizing the water sample and note on the chain-of-custody (COC) that the VOC water samples were containerized in unpreserved 40-mL vials. This notation must be on the COC since unpreserved VOC samples have a shorter holding time than HCl preserved VOC samples.

SOP C.5 Stabilization For Groundwater Sampling

During low-flow well purging, monitor stabilization parameters (ORP, temperature, specific conductance, pH, DO) every three to five minutes (or each time the flow-through cell has cycled its full volume). Note: during the early phase of purging emphasis should be put on minimizing and stabilizing pumping stress, and recording those adjustments. Purging is considered complete and sampling may begin when all the indicator field parameters listed below have stabilized or when a maximum of 1-hour pf purging has

been completed. Stabilization is considered to be achieved when three consecutive readings are within the following limits:

Parameter	Stabilization Criteria
DO	± 0.2 mg/L or ± 10%
ORP	± 10 millivolts
pH	± 0.1 standard units
Specific Conductance	± 3%

All measurements must be obtained using a flow through-cell. Transparent flow-through-cells are preferred, because they allow field personnel to watch for particulate build-up within the cell. This build-up may affect indicator field parameter values measured within the cell and may also cause an underestimation of turbidity values measured after the cell. If the cell needs to be cleaned during purging operations, continue pumping and disconnect cell for cleaning, then reconnect after cleaning and continue monitoring activities. The flow-through-cell must be designed in a way that prevents air bubble entrapment in the cell.

SOP C.6 Purging and Sampling Procedures

C.6.1 Bailer Purging and Sampling

- Use a water level indicator to measure the water level present in the monitoring well.
- Calculate the well volume using the length of the measured water column and the casing volume per foot factor that corresponds to the appropriate well diameter.
- Gently lower the bailer into the water column by rope and purge three (3) to five (5) well volumes, making sure to minimize turbidity, and placing the purged groundwater into approved containers for disposal.
- Temporarily containerize the purge water into an appropriate purge sampling container (typically a 1-5-gallon container or bucket) then transfer to a 55-gallon drum, after obtaining the appropriate stabilization readings.
- After appropriate number of well volumes have been purged or the stabilization criteria has been met, sample the groundwater directly from the bailer, starting with filling the volatile compound containers first, then semi-volatile and finally the non-volatile sample containers.
- Temporarily containerize the purge water into an appropriate purge sampling container (typically a 1-5-gallon container or bucket) then transfer to a 55-gallon drum, after obtaining the appropriate stabilization readings.
- Decontaminate the water level indicator and dispose of the dedicated bailer and rope.

C.6.2 Low-Flow Purging and Sampling

- Use a water level indicator to measure the water level present in the monitoring well.
- Calculate the well volume using the length of the measured water column and the casing volume per foot factor that corresponds to the appropriate well diameter.
- Gently lower the sampling pump and dedicated tubing into the water column to the appropriate depth, generally the midpoint of the water column.
- Insure that the groundwater level equalizes with the inclusion of the sampling pump with the water level indicator.
- Begin the purging process, insuring that the drawdown during the purge cycle does not exceed 0.3 feet.
- Monitor the stabilization parameters such as DO, pH, specific conductance, ORP, and temperature at the appropriate intervals and log them on the water parameter monitoring form or fieldbook.
- After three consecutive readings that are within the limits listed above, the groundwater is considered stabilized and sampling can occur. If stabilization does not occur after three well volumes, continue purging to a maximum of six well volumes before collecting groundwater samples or for a period not exceeding 1-hour.
- Collect groundwater directly from the tubing before the flow-through cell to insure a representative sample is obtained. Purge rates should be adjusted so that the pumping rate does not cause excessive agitation of the groundwater during sampling. Fill the volatile compound containers first, followed by the semi-volatiles, and finally the non-volatile sample containers.
- Temporarily containerize the purge water into a 5-gallon bucket then transfer to a 55-gallon drum.

SOP C.7 Decontamination

All non-dedicated equipment must be decontaminated between each sampling point or well. Decontamination procedures follow the generalized field procedures in SOP Group D section D.1.2.

APPENDIX

Water Parameter Monitoring Form

Groundwater Sampling Field Information Form

Site Name: Personnel:

Sample ID: Sample Date:

Well Data

Depth to Water (feet below TOC): Initial DTW:

Screen Interval (feet below TOC): Volume Purged (gallons):

Total Well Depth (feet below TOC): Purge Start Time:

Well Volume (gallons): Purge End Time:

Sampling Data

Analysis Type: Sample Tube Type: Teflon-lined polyethylene

Sample/Purge Device: QED Micropurge Pump Filtered? Yes No Type:

Pump Intake Elevation (feet below TOC): **Intake of pump should be the midpoint of the saturated screen/water column.**

Field Parameters

Time	DTW (ft)	Purge Rate (mL/min)	pH ± 0.1	COND (mS/cm) ± 3%	D.O. (mg/L) ± 10% or ± 0.2 mg/L	TEMP (°C) ± 10%	ORP (mV) ± 10	Notes

Sample Time: Notes:

Sample Appearance: Weather Conditions:

Attachment C

Pace Analytical Services, LLC – Chain of Custody

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical®

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

ALL SHADED AREAS are for LAB USE ONLY

Company:	Billing Information:
Address:	
Report To:	Email To:
Copy To:	Site Collection Info/Address:
Customer Project Name/Number:	State: County/City: Time Zone Collected: / [ ]PT [ ]MT [ ]CT [ ]ET

Phone: Email:	Site/Facility ID #:	Compliance Monitoring? [ ] Yes [ ] No
Collected By (print):	Purchase Order # : Quote #:	DW PWS ID #: DW Location Code:
Collected By (signature):	Turnaround Date Required:	Immediately Packed on Ice: [ ] Yes [ ] No
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: _____ [ ] Hold: _____	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)	Field Filtered (if applicable): [ ] Yes [ ] No Analysis: _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start)		Composite End		Res Cl	# of Ctns
			Date	Time	Date	Time		

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

Container Preservative Type **										Lab Project Manager:
Analyses										Lab Profile/Line:

Lab Sample Receipt Checklist:
Custody Seals Present/Intact Y N NA
Custody Signatures Present Y N NA
Collector Signature Present Y N NA
Bottles Intact Y N NA
Correct Bottles Y N NA
Sufficient Volume Y N NA
Samples Received on Ice Y N NA
VOA - Headspace Acceptable Y N NA
USDA Regulated Soils Y N NA
Samples in Holding Time Y N NA
Residual Chlorine Present Y N NA
Cl Strips: _____
Sample pH Acceptable Y N NA
pH Strips: _____
Sulfide Present Y N NA
Lead Acetate Strips: _____

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:	Type of Ice Used: Wet Blue Dry None Packing Material Used: Radchem sample(s) screened (<500 cpm): Y N NA	SHORT HOLDS PRESENT (<72 hours) : Y N N/A Lab Tracking #: Samples received via: FEDEX UPS Client Courier Pace Courier

LAB Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: _____
Cooler 1 Temp Upon Receipt: __oC
Cooler 1 Therm Corr. Factor:___oC
Cooler 1 Corrected Temp: _____oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: _____ of: _____

Attachment D

Pace Analytical Services, LLC Documentation

Target Analyte	CAS Number	Method	RL ug/L	MDL ug/L	2018 RCG Ground Water Tap Limit ug/L	LCS Limits % Rec.	MS/MSD Limits % Rec.	RPD Max %
1,1-Dichloroethane (DCA)	75-34-3	8260C	5.0	0.6	28	NA	NA	NA
1,2-Dichloroethane (EDC)	107-06-2	8260C	5.0	0.6	5	NA	NA	NA
cis -1,2-Dichloroethene	156-59-2	8260C	5.0	0.65	70	NA	NA	NA
trans -1,2-Dichloroethene	156-60-5	8260C	5.0	0.86	100	NA	NA	NA
Methylene Chloride (Dichloromethane)	75-09-2	8260C	5.0	5.0	5	NA	NA	NA
Tetrachloroethene (PCE)	127-18-4	8260C	5.0	0.93	5	76-116	34-140	20
1,1,1-Trichloroethane (TCA)	71-55-6	8260C	5.0	0.89	200	74-126	50-141	20
Trichloroethene (TCE)	79-01-6	8260C	5.0	0.8	5	76-120	40-141	20
Vinyl Chloride (Chloroethene)	75-01-4	8260C	2.0	0.97	2	64-155	46-164	20

NOTES:
Compounds, Reporting Limits, Method Detection Limits, Control Limits, and/or Method versions are subject to change.
[a]Limit not achievable
[b]Limit may be achievable based on MDL - check with laboratory
[c]Limit not achievable, must use 8270 PAH-SIM method to achieve this limit
*****Synonym: 1,1,2-Trichloro-1,2,2-trifluoroethane

Attachment E

Applicable USEPA Regional Screening Levels
(Site specific shortlist only)

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #29); H = HEAST; F = See FAQ; E = see user guide Section 2.3.5; W = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile; R = RBA applied (See User Guide for Arsenic notice) ; c = cancer; n = noncancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide)

Toxicity and Chemical-specific Information												Contaminant		Screening Levels												Protection of Ground Water SSLs		
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD$_o$ (mg/kg-day)	key	RfC$_i$ (mg/m^3)	key	vol	muta-gen	GIABS	ABS	C$_{sat}$ (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	key	MCL-based SSL (mg/kg)
5.7E-03	C	1.6E-06	C	2.0E-01	P			V		1		1.69E+03	Dichloroethane, 1,1-	75-34-3	3.6E+00	c	1.6E+01	c	1.8E+00	c	7.7E+00	c	2.8E+00	c		7.8E-04	c	
9.1E-02	I	2.6E-05	I	6.0E-03	X	7.0E-03	P	V		1		2.98E+03	Dichloroethane, 1,2-	107-06-2	4.6E-01	c*	2.0E+00	c*	1.1E-01	c*	4.7E-01	c*	1.7E-01	c*	5.0E+00	4.8E-05	c*	1.4E-03
				2.0E-03	I			V		1		2.37E+03	Dichloroethylene, 1,2-cis-	156-59-2	1.6E+02	n	2.3E+03	n					3.6E+01	n	7.0E+01	1.1E-02	n	2.1E-02
				2.0E-02	I			V		1		1.85E+03	Dichloroethylene, 1,2-trans-	156-60-5	1.6E+03	n	2.3E+04	ns					3.6E+02	n	1.0E+02	1.1E-01	n	3.1E-02
2.0E-03	I	1.0E-08	I	6.0E-03	I	6.0E-01	I	V	M	1		3.32E+03	Methylene Chloride	75-09-2	5.7E+01	c**	1.0E+03	c**	1.0E+02	c**	1.2E+03	c**	1.1E+01	c**	5.0E+00	2.9E-03	c**	1.3E-03
2.1E-03	I	2.6E-07	I	6.0E-03	I	4.0E-02	I	V		1		1.66E+02	Tetrachloroethylene	127-18-4	2.4E+01	c**	1.0E+02	c**	1.1E+01	c**	4.7E+01	c**	1.1E+01	c**	5.0E+00	5.1E-03	c**	2.3E-03
				2.0E+00	I	5.0E+00	I	V		1		6.40E+02	Trichloroethane, 1,1,1-	71-55-6	8.1E+03	ns	3.6E+04	ns	5.2E+03	n	2.2E+04	n	8.0E+03	n	2.0E+02	2.8E+00	n	7.0E-02
4.6E-02	I	4.1E-06	I	5.0E-04	I	2.0E-03	I	V	M	1		6.92E+02	Trichloroethylene	79-01-6	9.4E-01	c**	6.0E+00	c**	4.8E-01	c**	3.0E+00	c**	4.9E-01	c**	5.0E+00	1.8E-04	c**	1.8E-03
7.2E-01	I	4.4E-06	I	3.0E-03	I	1.0E-01	I	V	M	1		3.92E+03	Vinyl Chloride	75-01-4	5.9E-02	c	1.7E+00	c	1.7E-01	c	2.8E+00	c	1.9E-02	c	2.0E+00	6.5E-06	c	6.9E-04

Attachment F

IDEM RCG Screening Levels
(Site specific shortlist only)

Table A-6: 2018 Screening Levels

Chemical		Soil Exposure						Ground Water				Vapor Exposure					
		Direct Contact						Soil MTG		Tap		Ground Water				Indoor Air			
		Residential		Com/Ind		Excavation		Residential		Residential		Residential		Com/Industrial		Residential		Com/Ind	
Name	CASRN	(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(ug/L)		(ug/L)		(ug/L)		(ug/m3)		(ug/m3)	
Dichloroethane, 1,1-	75-34-3	50	C	160	C	1700	S	0.16	C	28	C	130	C	550	C	18	C	77	C
Dichloroethane, 1,2-	107-06-2	6.4	C	20	C	730	N	0.028	M	5	M	50	C	210	C	1.1	C	4.7	C
Dichloroethylene, 1,2-cis-	156-59-2	220	N	2300	N	2400	S	0.41	M	70	M								
Dichloroethylene, 1,2-trans-	156-60-5	1900	S	1900	S	1900	S	0.62	M	100	M								
Methylene Chloride	75-09-2	490	N	3200	N	3300	S	0.025	M	5	M					630	N	2600	N
Tetrachloroethylene	127-18-4	110	N	170	S	170	S	0.045	M	5	M	110	N	470	N	42	N	180	N
Trichloroethane, 1,1,1-	71-55-6	640	S	640	S	640	S	1.4	M	200	M	13000	N	54000	N	5200	N	22000	N
Trichloroethylene	79-01-6	5.7	N	19	N	95	N	0.036	M	5	M	9.1	N	38	N	2.1	N	8.8	N
Vinyl Chloride	75-01-4	0.83	C	17	C	1300	C	0.014	M	2	M	2.1	C	35	C	1.7	C	28	C

C = Carcinogenic endpoint
CASRN = Chemical Abstracts Service Reference Number
L = Capped at 100,000 mg/kg (soil direct contact only)
M = Set to maximum contaminant limit (MCL; ground water only) or based on MCL (migration to ground water)
mg/kg = milligrams per kilogram
MTG = Migration to ground water
N = Noncarcinogenic endpoint
R = Capped at 1,000,000 mg/kg (migration to ground water only)
S = Capped at soil saturation limit
ug/L = micrograms per liter
ug/m^3 = micrograms per cubic meter